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THREE NEW NEOTROPICAL *RHIZOECUS* (HOMOPTERA: PSEUDOCOCCIDAE)

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Abstract.—Three new species in the genus *Rhizoecus* Künckel d'Herculais, *R. divaricatus* from Nicaragua, *R. olmuensis* from Chile and *R. variabilis* from Colombia, are described and illustrated. *Rhizoecus divaricatus* is a pest of coffee and is the first known species of the genus from Nicaragua.

Among several collections of mealybugs received for identification are three undescribed species of *Rhizoecus* from Central and South America. With the addition of *R. divaricatus* from Nicaragua, a total of 14 species of *Rhizoecus* are known to occur in the American tropics on the roots of coffee. Three other species of closely related genera of the tribe Rhizoecini also occur on coffee. The new species, *R. olmuensis* and *R. variabilis*, are from Chile and Colombia respectively. *Rhizoecus variabilis* was found on *Agave* sp., but the host of *R. olmuensis* is unknown.

The genus *Rhizoecus*, with the three species described as new, contains 60 species for the Western Hemisphere. My key to the species (1976) is revised to accommodate the new species as follows:

4(3). "Antennae 6-segmented *sonomae* McKenzie"
– Antennae 5-segmented A
A(4). With 1 circulus; sensory setae not clavate; tubular ducts present *californicus* Ferris
– With 2 circuli; sensory setae clavate; tubular ducts absent *divaricatus*, new species

and

37(36). Anal lobes sclerotized; anal ring 45–60 μ wide; rostrum 51–57 μ long 38
– Anal lobes unsclerotized; anal ring 68–78 μ wide; rostrum 65–95 μ long B
38(37). "Anal ring about 60 μ wide, its setae about 87 μ long, outer part with 25–30 large, angular, irregularly quadrate, mostly isolated cells; orifice of circulus narrow, less than ½ its basal width *floridanus* Hambleton"
– "Anal ring about 45 μ wide, its setae about 55 μ long, outer part with 19–20 small, elongate, oval cells almost touching end to end; orifice of circulus wide, more than ½ its basal width *tropicalis* Hambleton"
B(37). Tubular ducts absent; with 250 tritubular cerores *olmuensis*, new species
– Tubular ducts present; with 45–145 tritubular cerores 39

39(B). Tubular ducts varying in size, complex in design; with 130–145 tritubular cerores; apical segment of antennae less than 2× as long as wide; sensory seta on segment V short, stout *relativus* Hambleton

– Tubular ducts about same size, of simple design; with 45–50 tritubular cerores; apical segment of antennae 2× as long as wide; sensory seta on segment V narrow, elongate *ovatus* Hambleton

and

41(40). "Digitules at least ½ as long as claws, hind claw about 40 μ long; rostrum about 80 μ long and 78 μ wide; with 35–40 tritubular cerores; lobe setae about same size as ring setae *maritimus* (Cockerell)"

– Digitules less than ½ as long as claws, hind claw 24–26 μ long; rostrum 69–73 μ long; lobe setae shorter and more slender than ring setae C

C(41). Anal ring 80 μ in diameter; 46–48 cells of outer part without spicules; cephalic plate absent; circulus dome shaped, 36 μ wide at base *variabilis*, new species

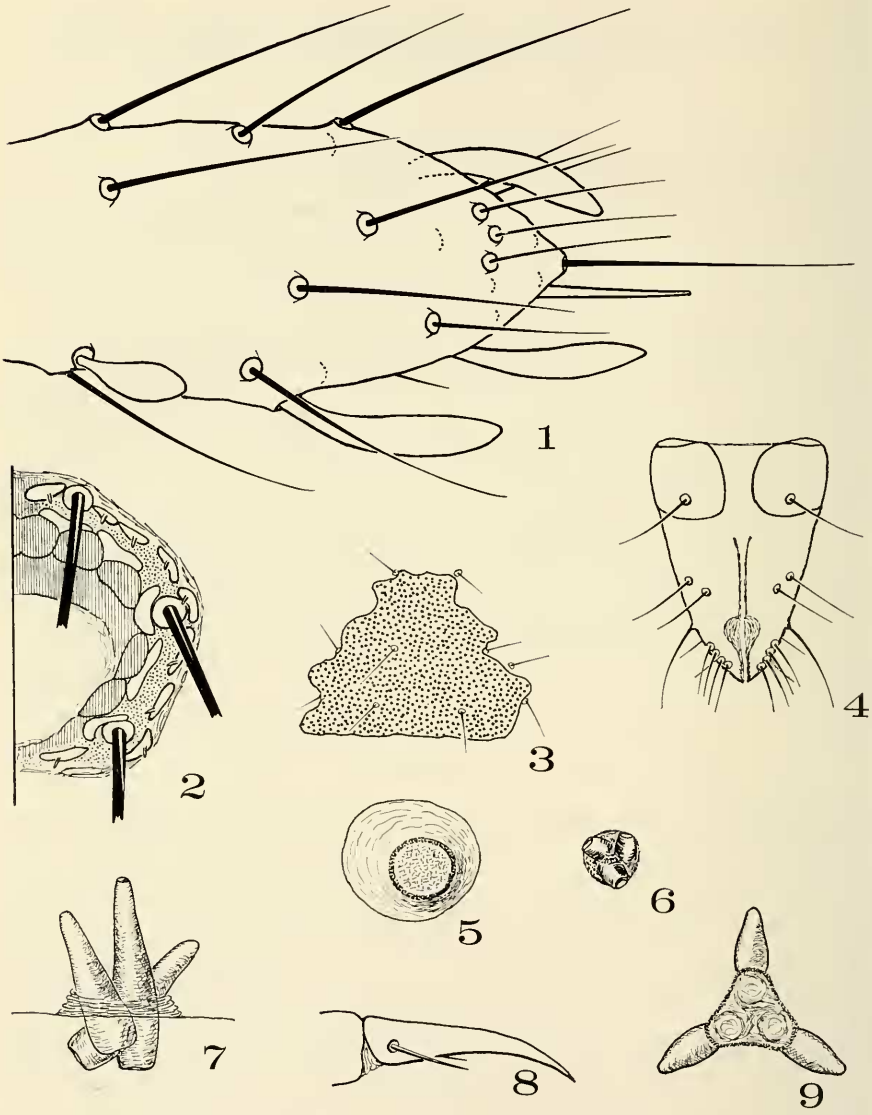
– Anal ring 57 μ in diameter, 24–30 cells of outer part with spicules; cephalic plate present; circulus conical, about 19 μ wide at base *arabicus* Hambleton

Rhizoecus divaricatus Hambleton, new species
Figs. 1–9

Adult female.—Oval elongate, stout, broadest across abdomen. Length, 1.63–2.16 mm; width, 0.95–1.11 mm. Antennae 5-segmented, rather stout, average length of segments in microns: I, 35; II, 23; III, 30; IV, 19; V, 75; apical segment 2× as long as wide, with 4 stout, clavate sensory setae that taper distally, and 1 spinelike sensory seta near apex. Interantennal space about length of segment I. Eyes absent. Rostrum of medium size, averaging 67 μ long, 53 μ wide; rostral loop reaching 2nd coxae. Cephalic plate irregularly triangulate, 8–10 small body setae on or near its periphery, length 53 μ, width, 63 μ. Dorsal ostioles strongly sclerotized, with body setae and pores bordering ostiole rims.

Legs moderately short, stout, average length of segments of hind pair in microns: Trochanter, 46; femur, 94; tibia, 88; tarsus, 72; claw, 27; digitules short, setose, not reaching to ½ length of elongate, narrow claws.

Two conical circuli, 16 μ wide at base, 1 each on abdominal segments III and IV. Anal lobes each with strongly sclerotized protruding area, longer than width of anal ring, and 12–14 subequal elongate setae, longest 80–83 μ long. Anal ring of medium size, about 46 μ wide, its setae stouter than longest anal-lobe seta, about 60 μ long; outer portion of anal ring



Figs. 1–9. *Rhizoecus divaricatus*, female. 1. Terminal segment of antenna; 2. Anal ring, right half; 3. Cephalic plate; 4. Rostrum; 5. Circulus; 6. Tritubular ceroris, small, dorsal; 7. Tritubular ceroris, large, lateral; 8. Hindclaw; 9. Tritubular ceroris, large, ventral.

with 18 small, oval, elongate cells, each with elongate spicule; inner portion of ring with 8–12 larger, more elongate cells, some serpentine shaped, adjacent to 8–10 large, darkened, globular cells. Tritubular cerores of 2 types, 14 large ones with stout, tapering, divaricating ducts ranging between 15–24 μ long, occurring dorsally on or near body margins and along middorsal line, 8 ventrally and submarginally slightly smaller; the remaining 16–21 cerores about ½ size of larger type with short, stout ducts, 8–9 μ long, occurring ventrally across abdominal segments V–IX, occasionally 1 on IV. Multilocular disk pores occurring ventrally, 21–49 scattered on abdominal segments VIII–IX, 5–8 along posterior border of VII, 1–6 on VI. Tubular ducts absent. Trilocular pores fairly evenly distributed but sparse in some areas. Body setae sparse, mostly short, inconspicuous, larger setae about 60 μ long.

Holotype female.—Nicaragua: Granada, 5-I-1975, José Gonzales, on roots of *Coffea arabica*; paratypes, 5 mounted on 2 slides, taken with holotype. All in USNM.

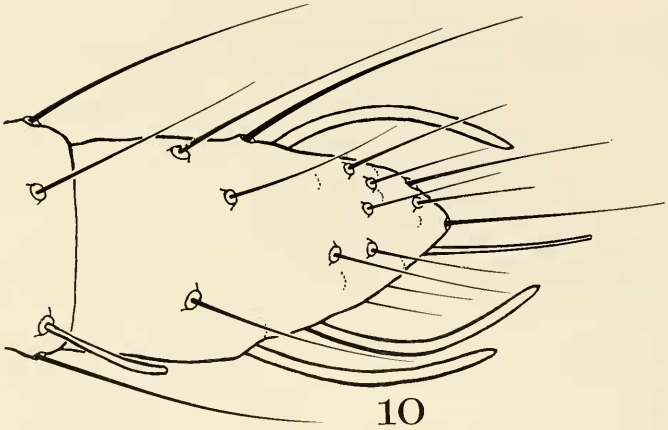
This interesting mealybug keys to *R. californicus* Ferris but differs by possessing only 38–45 cerores of 2 types, by having 2 circuli, by its stout, clavate sensory setae, and by the absence of tubular ducts. *Rhizoecus divaricatus* most closely resembles *R. vitis* Borchenius from the Crimea. It differs primarily by having 2 instead of 3 circuli, a large triangulate cephalic plate, and no tubular ducts. *Rhizoecus divaricatus* is the first recorded species of the genus from Nicaragua.

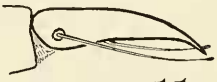
Rhizoecus olmuensis Hambleton, new species
Figs. 10–15

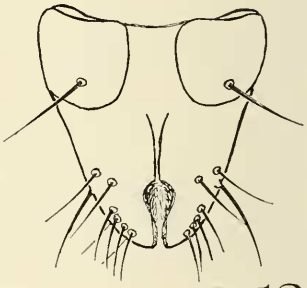
Adult female.—Undistended body elongate. Length, 0.94 mm; width, 0.37 mm. Antennae 6-segmented, of medium size, length of segments in microns: I, 28; II, 22; III, 28; IV, 20; V, 19; VI, 43; apical segment less than 2× as long as wide, with 3 narrow, elongate falcate sensory setae and 1 slender, spinelike sensory seta; segment V with 1 shorter, elongate sensory seta. Interantennal space equal to length of segment I. Eyes absent. Rostrum 65 μ long, 57 μ wide; rostral loop reaching beyond 2nd coxae. Cephalic plate 38 μ long, 30 μ wide, irregularly quadrate, with 4–5 body setae on its periphery. Dorsal ostioles conspicuous, sclerotized, pores and setae not crowded near ostiole rims.

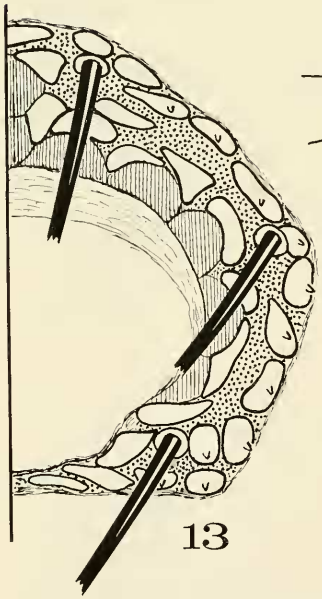
Legs of medium size, length of segments of hind pair in microns: Trochanter, 40; femur, 83; tibia, 73; tarsus, 51; claw, 20; digitules slender, dilated apically, extending to or slightly beyond apex of stout, acute, curved claws.

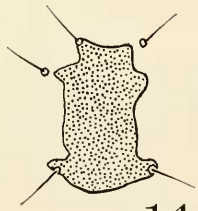
One conical circulus, about 10 μ in diameter as base. Anal lobes undeveloped, unsclerotized, each with 3 elongate setae, longest about 57 μ

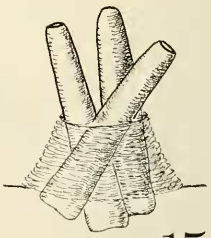












Figs. 10–15. *Rhizoecus olmuensis*, female. 10. Terminal segments of antenna; 11. Hind claw; 12. Rostrum; 13. Anal ring, right half; 14. Cephalic plate; 15. Tritubular ceroris, lateral.

and several body setae. Anal ring prominent, 74 μ wide, its setae stouter and longer than anal-lobe setae, 77–82 μ long; outer portion of anal ring with about 28 irregularly oval or triangulate cells, most with short, blunt spicules; inner portion of ring with 18–20 elongate curved to triangulate

cells adjacent to area of darkened, globular cells. Tritubular cerores of medium size, 4.5–5.0 μ wide, their ducts about 7 μ long, about 250 well distributed over derm, occurring with setae and pores, forming bands around segments, leaving clear areas intersegmentally. Multilocular disk pores and tubular ducts absent. Trilocular pores fairly abundant, more numerous dorsally. Body setae variable in size and length, longest about 40 μ long, uniformly distributed.

Holotype female.—Chile: El Granizo, Olmue, Valparizo Prov., 5-IV-1961, L. Campos. Host unknown. In University of California at Davis.

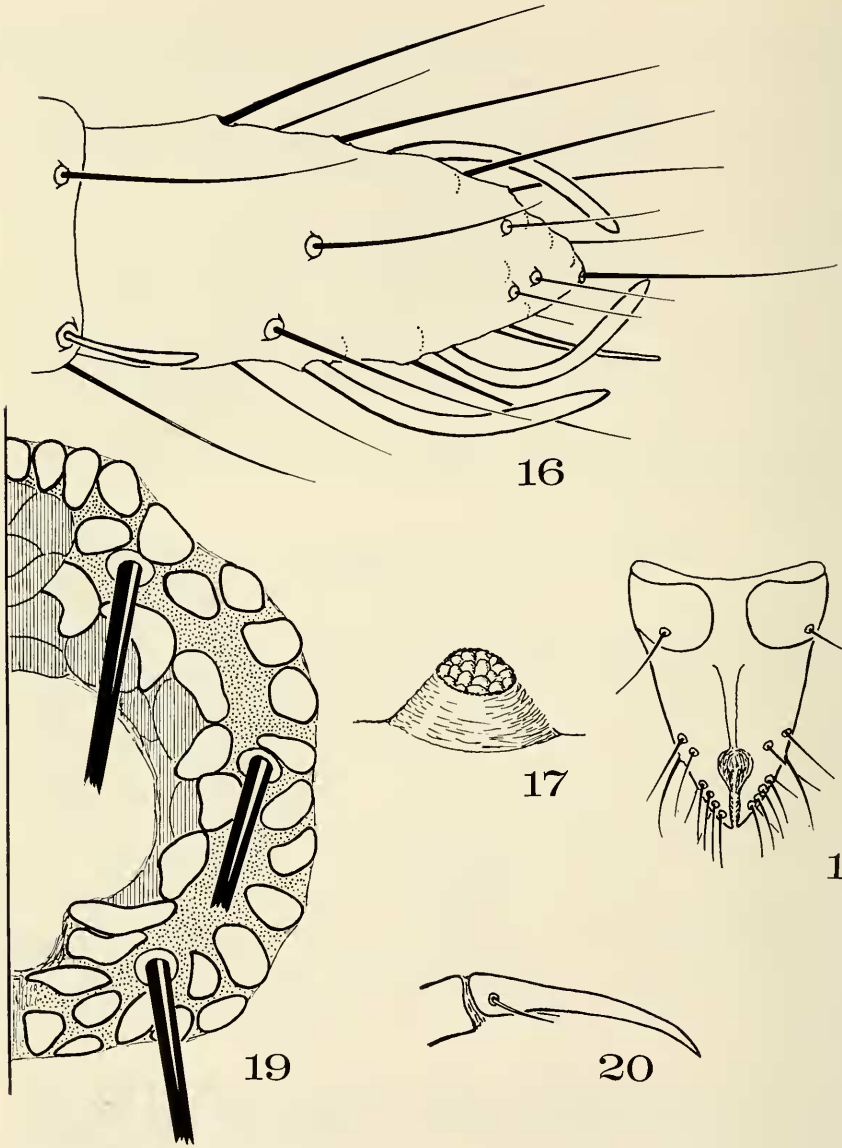
The description of *R. olmuensis* is based on a mature undistended female, consequently the body measurements given are tentative. In the revised key this species places close to *R. relativus* Hambleton. The absence of tubular ducts and greater number of cerores in *olmuensis* readily separate the two species. In general appearance *olmuensis* resembles *R. advenoides* Takagi and Kawai from Japan but differs in the absence of eyes, multilocular disk pores and tubular ducts.

Rhizoecus variabilis Hambleton, new species
Figs. 16–20

Adult female.—Oval elongate. Length, 1.75–2.19 mm; width, 0.85–1.20 mm. Antennae 6-segmented, elongate, average length of segments in microns: I, 34; II, 25; III, 49; IV, 20; V, 20; VI, 59; apical segment 2× as long as wide, with 3 elongate, medium-sized falcate sensory setae and 1 shorter, strongly tapered sensory seta; segment V with 1 smaller, weakly lanceolate sensory seta. Interantennal space equal to combined length of segments IV–VI. Eyes small, hemispherical. Rostrum averaging 73 μ long, 57 μ wide; rostral loop extending beyond halfway to 2nd coxae. Cephalic plate apparently absent. Dorsal ostioles inconspicuous, weakly sclerotized, bordered by few setae and pores.

Legs moderately stout, elongate, average length of segments of hind pair in microns: Trochanter, 51; femur, 143; tibia, 110; tarsus, 67; claw, 26; digitules short, setose, variable in length, sometimes about as long as slender claws.

One domed-shaped, faveolate circulus, 36 μ wide at base, 15 μ across orifice. Anal lobes undeveloped, each lobe area with 1 elongate seta, about 88 μ long and 2 shorter setae. Anal ring large, well defined, 80 μ in diameter, ring setae averaging 91 μ long, longer and stouter than lobe setae; outer portion of anal ring with 46–48 oval, subtriangulate cells unevenly arranged; cells of inner portion of ring 24–26 in number, larger, more irregular, some elongate, bordered by a darkened, semicircular, cellular area. Tritubular cerores small, with finely tapered ducts, 55–65 present, widely distributed, more common dorsally. Multilocular disk pores absent. Tubular



Figs. 16–20. *Rhizoecus variabilis*, female. 16. Terminal segments of antenna; 17. Circulus; 18. Rostrum; 19. Anal ring, right half; 20. Hind claw.

ducts short, stout, their diameter less than that of trilocular pore, sparsely distributed over derm dorsally and ventrally. Trilocular pores numerous, fairly evenly distributed. Body setae mostly short, rather inconspicuous, variable in length, longest about 36 μ long.

Holotype female.—Colombia: Garagoa, 1-V-1973, F. Mosquera, on *Agave* sp., on slide with 2 paratypes, specimen in middle is holotype; paratypes, 6 taken with holotype. In USNM.

Rhizoecus variabilis keys to *R. arabicus* Hambleton, also from Colombia. However, *variabilis* is a larger species and is readily separated from *arabicus* by the size of its anal ring, whose cellular structure is without spicules, by the dome-shaped faveolate circulus, by the narrow claws, and by the absence of a cephalic plate.

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